SPECTROCHIMICA ACTA

PART A: MOLECULAR SPECTROSCOPY

LIST OF CONTENTS AND AUTHOR INDEX

VOLUME 43A 1987

Editors

UNITED KINGDOM: **SIDNEY KETTLE,** *Norwich*

and

U.S.A.: **JEFFREY STEINFELD,** *Cambridge, MA*

PERGAMON PRESS
OXFORD · NEW YORK · BEIJING · FRANKFURT · SÃO PAULO
SYDNEY · TOKYO · TORONTO

SPECTROCHIMICA ACTA
PART A: MOLECULAR SPECTROSCOPY

EDITORS

UNITED KINGDOM

Professor Sidney Kettle, School of Chemical Sciences, University of East Anglia, Norwich NR4 7TJ, U.K.

UNITED STATES OF AMERICA

Professor Jeffrey Steinfeld, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA 02139, *U.S.A.*

EDITORIAL ADVISORY BOARD

P. W. J. M. Boumans, *Eindhoven, The Netherlands*
R. Bacis, *Villeurbanne, France*
J. Broekaert, *Dortmund, F.R.G.*
C. L. Chakrabarti, *Ottawa, Ontario*
D. T. Clark, *Durham, U.K.*
A. R. H. Cole, *Perth, Australia*
J. A. Coxon, *Halifax, Nova Scotia*
Z. Cunhao, *Dalian, People's Republic of China*
J. E. Griffiths, *Savannah, U.S.A.*
P. Griffiths, *Riverside, CA*
H. H. Günthard, *Zurich, Switzerland*
D. Hadži, *Ljubljana, Yugoslavia*
M. Ito, *Sendai, Japan*
R. Kaptein, *Utrecht, The Netherlands*
J. Lascombe, *Bordeaux, France*
P. C. Lauterbur, *Urbana, IL*
R. C. Lord, *Cambridge, MA*
D. C. McKean, *Aberdeen, U.K.*
D. J. Millen, *London, U.K.*
A. Müller, *Bielefeld, F.R.G.*
A. Pines, *Berkeley, CA*
C. N. R. Rao, *Bangalore, India*
J. Riveros, *São Paulo, Brazil*
N. Sheppard, *Norwich, U.K.*
W. Slavin, *Norwalk, CT*
R. E. Sturgeon, *Ottawa, Ontario*
R. L. Swofford, *Cleveland, OH*
S. C. Wallace, *Toronto, Ontario*
H. W. Werner, *Eindhoven, The Netherlands*
J. White, *Canberra, Australia*
G. Wilkinson, *London, U.K.*
M. K. Wilson, *Washington, D.C.*
E. S. Yeung, *Ames, IA*

Publishing and Advertising Offices: Pergamon Journals Ltd., Headington Hill Hall, Oxford OX3 0BW, England; (Tel. Oxford 64881) and Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

One volume *per annum*. Published monthly

Annual institutional subscription rate (1988) DM 1190.00. Two-year institutional rate (1988/89) DM 2261.00. Personal subscription rate for those whose library subscribes at the regular rate (1988) DM 228.00. Rates include postage and insurance.

Subscription enquiries from customers in North America should be sent to: Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Journals Ltd., Headington Hill Hall, Oxford OX3 0BW, U.K. Prices are subject to change without notice.

Microform subscriptions and back issues: Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Retention photocopies of Supplementary Publications may be obtained from: The British Library Document Supply Centre, Boston Spa, Wetherby, West Yorkshire, LS23 7BQ, U.K. Requesters must quote the relevant SUP number (e.g. SUP 12345). Supplementary Publications are made available on a pro forma invoice basis.

Copyright © 1987 Pergamon Journals Ltd.

It is a condition of publication that manuscripts submitted to this journal have not been published, and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the Publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform, or any other reproductions of similar nature, and translations. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording, or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A. The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.
The Item-fee Code for this publication is: 0584–8539/87 $3.00 + 0.00

CONTENTS OF VOLUME 43A

No. 1 January

N. SHEPPARD, H. A. WILLIS and J. C. RIGG: Names, symbols, definitions and units of quantities in optical spectroscopy. (Recommendations 1984) 1

ABOUL-FETOUH E. MOURAD: Molecular complexes of cyclophanes—XIII. Charge-transfer complexes of cyclophanes with fluoranil 11

M. C. MOREAU-DESCOINGS, G. GOETHALS, J. P. SEGUIN and J. P. DOUCET: Measurements of actual association ^{13}C shifts: medium effects on the TMS carbons 17

DEREK J. GARDINER, NICHOLAS A. WALKER and MARTIN P. DARE-EDWARDS: The use of Raman intensity measurements to monitor pressure and temperature induced changes in the conformational equilibria of a series of dimethylcyclohexanes 21

P. GEBOES, H. HOFMANS, H. O. DESSEYN, R. DOMMISSE, A. T. H. LENSTRA, S. BAMIDELE SANNI, J. M. M. SMITS and P. T. BEURSKENS: Study of *N,N'*-dihydroxyethyldithiooxamide by X-ray diffraction, u.v.-vis, NMR, Raman and i.r. spectroscopy 35

ROSALINDA CONTRERAS, HILDA R. MORALES, MA. DE LOURDES MENDOZA and CESAR DOMÍNGUEZ: ^{11}B Nuclear magnetic resonance study of the reactivity of borane tetrahydrofuran with representative dithianes, diazolidines, thiazolidines, benzothiazolines and benzothiazoles 43

LAWRENCE J. WILLIS and THOMAS M. LOEHR: Normal coordinate analysis of the molybdenum–oxygen stretching frequencies in the infrared and Raman spectra of ^{16}O- and ^{18}O-dioxomolybdenum(VI) complexes 51

SEUNG-BIN KIM and ROGER FRECH: Raman spectra of single crystal Li_2SeO_4 59

TIAN BOGANG, WU GUOZHEN and XU RUIYA: Crystal vibration of low temperature phase β-barium metaborate and its multipolar coupling 65

R. F. HOWE and M. J. TAYLOR: Vibrational spectra and normal coordinate analyses of the trimethyloxonium and trimethylammonium cations 73

H. YAMAGUCHI and M. HIGASHI: Magnetic circular dichroism spectra of benzofurazan and 2,1,3-benzothiadiazole in the vapor phase 79

N. DUBE and R. PRASAD: Spectroscopic and molecular orbital study of the conformational properties of ethyl 2-chloropropionate and ethyl 2-bromopropionate 83

R. MANOHARAN and S. K. DOGRA: Electronic spectra of 1- and 9-fluorenecarboxylic acids 91

F. GARCÍA SÁNCHEZ, M. HERNÁNDEZ LÓPEZ and J. C. MÁRQUEZ GÓMEZ: Isodifferential derivative synchronous fluorimetric approach for the determination of gallium and aluminium in mixtures . 101

R. J. GRAVES and H. W. WHITE: Study of the adsorption of acridine and phenazine on aluminum oxide using tunnelling spectroscopy 107

Research Note

I. L. BOTTO: A correlation between crystallographic and spectroscopic data for some Eulytite-type phosphates containing bismuth 119

Papers in Press 123

Announcements 127

Software Survey Section I

No. 2 February

JEFFREY I. STEINFELD: Spectroscopic measurements on infrared multiple-photon excitation dynamics . 129

HIDEAKI NAKANE and SOJI TSUCHIYA: Intermode vibrational energy flow in CH_3F and related polyatomic molecules excited by irradiation with TEA CO_2 laser 135

M. LENZI, E. MOLINARI, G. PICIACCHIA, V. SESSA and M. L. TERRANOVA: Vibrational relaxation rates by time-resolved i.r. multiphoton absorption in absorber–buffer mixtures 137

J. L. LYMAN, J. M. TELLE and R. C. ECKHARDT: The effect of collisions on vibrational energy distribution in polyatomic molecules 141

COLIN STEEL, RACHEL SCHATZBERGER and SOL KIMEL: Collisional effects in IRMPD of medium sized molecules 149

X. DE HEMPTINNE: Thermodynamic aspects of coherent light interaction 155

I. URSU, R. ALEXANDRESCU, V. DRAGANESCU, I. N. MIHAILESCU, I. MORJAN, A. M. PROKHOROV, N. V. KARLOV, A. S. LAGUTCHEV, A. N. ORLOV and YU. N. PETROV: Laser action on gas mixture flows through metal capillaries 163

R. S. KARVE, S. K. SARKAR, K. V. S. RAMA RAO and J. P. MITTAL: Vibrational energy relaxation in TEA CO_2 laser excited CF_2Cl_2 165

S. I. IONOV: Experimental investigations of i.r. spectra of highly vibrationally excited molecules. . . 167

V. N. Bagratashvili, V. N. Burimov, S. I. Ionov, A. P. Sviridov, A. A. Stuchebrukhov and I. M. Turovetz: Infrared spectroscopy and intramolecular vibrational relaxation of c-C_6F_{12} under the dissociation threshold . . . 169

A. V. Chugunov, S. V. Ivanov and V. Ya. Panchenko: The effect of a strong i.r. laser field on tri-atomic molecules . . . 171

W. C. Danen, D. W. Setser, H. H. Nguyen and Md. S. B. Ibrahim: Infrared laser multiphoton absorption and reaction of organic compounds: synthetically unique reaction control . . . 173

W. E. Farneth, M. W. Thomsen, D. G. Johnson and P. G. Zimmerman: Infrared multiphoton activation as a research tool in mechanistic organic chemistry . . . 181

C. D'Ambrosio, W. Fuß, K. L. Kompa and W. E. Schmid: Isotope separation by a q-switched continuous discharge CO_2 laser . . . 189

W. Fuß, G. Mengxiong, K. L. Kompa and Z. Linyang: CO_2 laser induced telomerization of $C_2H_4 + CF_3I$ 193

B. Schramm and J. Kern: Laser induced bimolecular reactions with BCl_3 . . . 197

P. K. Chowdhury, K. V. S. Rama Rao and J. P. Mittal: Direct observation of Retro-Diels-Alder reaction product in the i.r. multiphoton excited decafluorocyclo-hexane . . . 199

Sander van Smaalen, André Peremans, Henk F. Arnoldus and Thomas F. George: Dynamics of a laser-irradiated adatom . . . 201

Joseph S. Francisco and Jeffrey I. Steinfeld: Reactions of organosilanes initiated by infrared multiple photon excitation . . . 207

L. Nánai, I. Hevesi, F. V. Bunkin and B. S. Luk'yanchuk: The peculiarities of i.r. laser induced oxidations of metals . . . 211

V. N. Varakin, A. D. Lozovsky, A. M. Panesh and A. P. Simonov: Kinetics of molecular adsorption and laser-stimulated surface oxidation . . . 213

Martyn Poliakoff: The infra-red laser-induced photochemistry of $Fe(CO)_4$ . . . 217

E. E. Said-Galiyev and V. V. Korshak: Physico-chemical transformations at polymer surfaces by i.r. lasers . . . 223

W. Radloff, H. Hohmann, H. Albrecht and T. Freudenberg: Photolytic carbon deposition by i.r.-multi-photon dissociation of molecules . . . 225

S. H. Bauer: Laser heating for chemical conversions: unique features and limitations . . . 227

Donald F. McMillen, S. Esther Nigenda, Alicia C. Gonzalez and David M. Golden: Pulsed laser pyrolysis of dimethylnitramine and dimethylnitrosamine . . . 237

R. L. Woodin, C. F. Meyer and K. A. Kajkowski: Laser powered homogeneous pyrolysis of 1,3-butadiene . . . 241

L. Nemes and T. Székely: An investigation of the end-products of CO_2 laser irradiation of ethene gas 243

Robert N. Zitter: Nearly thermalized systems under continuous infrared laser excitation: expected and unexpected effects . . . 245

A. Mele, E. Molinari, F. Salvetti and M. L. Terranova: Rate control by vibrational energy transfer of i.r.-laser-induced sensitized organic reactions . . . 253

F. W. Lampe: The infrared laser photochemistry of silane . . . 257

J. Błażejowski and F. W. Lampe: Absorption of a high power CO_2-laser radiation by SiH_4, SiF_4, and CH_3PH_2 . . . 265

R. L. Woodin and A. Kaldor: Infrared laser techniques to study the structure and dynamics of transient species . . . 269

E. Borsella, L. Caneve, A. Giardini-Guidoni and A. Mele: I.r. multiple photon absorption and dissociation of simple molecules: luminescence and reactivity of electronic excited fragments . . . 277

E. B. Gordon and I. A. Boriev: Elementary chemical processes of atomic iodine and bromine as initiated by emission from iodine ($\lambda = 1.3\ \mu$m) and bromine ($\lambda = 2.7\ \mu$m) lasers . . . 281

H. Johansen and R. Müller: I.r.-multiphoton-photofragmentation of CF_2-CFCl: calculation of the pressure dependence . . . 285

J. Tardieu de Maleissye: Pressure and laser intensity effects on kinetic rates in binary reactive gas mixtures . . . 289

Josef Pola and Jiří Ludvík: Laser photosensitized oxidation of tetrafluoroethene by molecular oxygen 297

G. W. Rice and R. L. Woodin: Material synthesis by laser heating of gases . . . 299

No. 3 March

Editorial Announcement: Sir Harold Thompson Memorial Award . . . i

Rapid Communication

E. Spinner: Intensity transfer in the vibrational spectra of solid isotopic mixtures of sodium formate. Major dependence on crystal size in infrared but not in Raman band intensity transfer . . . 301

General Papers

A. B. Remizov, F. S. Bilalov and I. S. Pominov: The spectra and structure of sulphur-containing organic compounds—IV. The vibrational spectra and conformations of haloidmethylmethylsulphones $CH_3SO_2CH_2X$ . . . 309

N. B. Colthup and L. Porter Powell: Vibrational analysis of alkyl xanthates 317
M. E. Kozlov, K. I. Pokhodnia and A. A. Yurchenko: The assignment of fundamental vibrations of BEDT-TTF and BEDT-TTF-d_8 323
Jens Spanget-Larsen, Daniel H. Christensen and Erik W. Thulstrup: Symmetry assignments of vibrations in 9,10-anthraquinone aligned in stretched polyethylene 331
P. Tarte, A. Rulmont, K. Sbai and M. H. Simonot-Grange: Vibrational spectrum of $KM^{II}P_3O_9$ tricyclophosphates with the benitoite structure 337
Mozart N. Ramos and Márcia M. C. Ferreira: Infrared intensity parameters of the diacetylene and acidity of acetylenic hydrogens 345
M. M. Degtyarik, P. N. Gaponik, V. N. Naumenko, A. I. Lesnikovich and M. V. Nikanovich: Infrared spectroscopic study of copper(II) complexes with *N*-substituted tetrazoles 349
M. Garcia-Vargas, M. Milla, J. L. Hidalgo de Cisneros and J. M. Bautista Rodriguez: Spectral (u.v.-vis, i.r. and MS), electrochemical and metallochromic properties of 2-hydroxybenzoylhydrazones of acetylpyridines 355
J. Hanuza and L. Macalik: Polarized infra-red and Raman spectra of monoclinic α-$KLn(WO_4)_2$ single crystals (Ln = Sm–Lu, Y) 361
Wang Jian, Li Dawei, Xin Houwen, S. Xu and Liu Fan-chen: Surface enhanced Raman spectra (SERS) of pyridine and dye-1555 adsorbed on silver bromide colloids 375
Li Dawei, Wang Jian, Xin Houwen, S. Xu and Liu Fan-chen: Enhancement origin of SERS from pyridine adsorbed on AgCl colloids 379
Brian E. Smith and Bruce D. James: Tetrahydroboratobis(triphenylphosphine)-copper(I): a vibrational spectroscopic study 383
Armando Codoñer, Isidro S. Monzó, Piedad Medina and Francisco Tomás: Spectroscopic study of molecular associations between flavins FAD and RFN and some indole derivatives 389
H. Tanaka, J. Henning, H. D. Lutz and G. Kliche: Infrared and Raman spectra of $CuCl_2 \cdot 2\text{-}(H, D)_2O$ and $K_2CuCl_4 \cdot 2(H, D)_2O$. Vibrational modes, assignment and coupling of the water librations . . 395
Bo-Long Poh: Correlations of chemical shifts of saturated carbon atoms that have a directly bonded substituent 401
Otto S. Wolfbeis and Wolfgang Trettnak: Fluorescence quenching of acridinium and 6-methoxy-quinolinium ions by Pb^{2+}, Hg^{2+}, Cu^{2+}, Ag^+ and hydrogen sulphide 405
Valéria Bussacchini, Gérard Perichet et Pierre Meallier: Photodégradation des molécules phytosanitaires—IV. Etude spectroscopique du phenmédiphame: spectres expérimentaux 409
A. O. Diallo, Nguyen-van-Thanh and I. Rossi: Infrared spectra and conformation of cyclopropylamine, CPA 415
R. K. Khanna, M. A. Perera-Jarmer and M. J. Ospina: Vibrational infrared and Raman spectra of dicyanoacetylene 421
M. M. Andino, C. G. de Lima and J. D. Winefordner: Luminescence characteristics of caffeine and theophylline 427
John F. Geldard and H. Keith McDowell: Constrained force constants for octahedral molecules . 439
J. J. Lopez-Gonzalez, A. Cardenete, M. Fernandez-Gomez and J. F. Arenas: A general quadratic force field for the diazirine molecule 447
N. J. Brassington, H. G. M. Edwards and V. Fawcett: The vibrational Raman spectra of selenium trioxide 451
A. Baldacci, A. Gambi, S. Giorgianni, R. Visinoni and S. Ghersetti: A vibrational study of the infrared spectrum of dibromodifluoromethane, CBr_2F_2 455
Book Review 463
Papers in Press 465
Announcement 469
Software Survey Section I

No. 4 April

Rapid Communication

C. S. Sreekanth, M. S. Hedge and C. N. R. Rao: An ultraviolet photoelectron spectroscopic study of the electron states of iodine complexes with electron donors 471

General Papers

A. B. Remizov, F. S. Bilalov and I. S. Pominov: The spectra and structure of sulphur-containing organic compounds—V. The vibrational spectra and conformations of $p\text{-}RC_6H_4SO_2CH_2X$ sulphones . . 475
S. G. Fedorenko, A. Yu. Pusep and A. I. Burshtein: The transformation of inhomogeneously broadened spectra due to frequency migration 483
Guido Busca, Gianguido Ramis, Vincenzo Lorenzelli, André Janin and Jean-Claude Lavalley: FT-i.r. study of molecular interactions of olefins with oxide surfaces 489
Refat Abdel-Hamid, Ahmed A. El-Samahy, Mahmoud A. Abdel-Rahman and Hussein El-Sagher: Studies of charge transfer complex equilibria on iodine-thiazoles by constant activity method . . 497

D. N. SATHYANARAYANA, S. V. KASMIR RAJA and R. SHUNMUGAM: Vibrational spectra of imidazoline-2-thione and imidazoline-2-one . . . 501

K. MAURING, I. RENGE, P. SARV and R. AVARMAA: Fluorescence-detected triplet kinetics study of the specifically solvated chlorophyll *a* and protochlorophyll in frozen solutions . . . 507

MONIA CHEIKH and ROB HUBBARD: Study of the $\nu_1 + \nu_3$ infrared band of ONCl . . . 515

A. JYOTHI and G. N. RAO: Synthesis, structure and infrared spectral studies of some new metal (II) complexes of 3-phenyl-4-acetyl-5-isoxazolone (HPAI) . . . 517

ERLING RYTTER: A comment on emission, reflection and transmission spectroscopy of thin films . . 523

FRANK QUAEYHAEGENS, HENDRIK HOFMANS and H. O. DESSEYN: The vibrational spectra of the Ni(II) and Cu(II) complexes with oxamic hydrazide . . . 531

ANNETE MARCHAND, PIERRE GERVAL, MOHAMED AHRA et MICHELINE GRIGNON-DUBOIS: Fréquences caractéristiques de triméthylsilyl- et chloro-bicyclo (*n*, 1, 0) alcanes: relations avec la structure . . 539

KERSTIN M. LARSSON and JOZEF KOWALEWSKI: Scalar relaxation of homonuclear multiple-quantum coherences and relative signs of ^{14}N–^{1}H spin–spin coupling constants in *E*-*N*-phenylformamide . . 545

D. J. BRASSINGTON, A. N. FREEDMAN and C. K. LAIRD: The feasibility of detecting partial discharges in metalclad equipment by tunable diode laser spectrometry of SF_6 breakdown products . . . 549

JOSEPH A. CRAYSTON and GEORGE DAVIDSON: Vibrational spectroscopy of platinum(0) complexes—III. An improved normal coordinate analysis for $Pt^{(0)}(C_2H_4)$ and other $M(C_2H_4)$ systems . . . 559

WILLIAM M. SHIRLEY: Nuclear quadrupole resonance studies of hydrogen bonding in *trans*-dichlorobis(ethylenediamine)cobalt(III) diaquahydrogen chloride . . . 565

NORMAN C. CRAIG, JULIANTO PRANATA, SARA JAMIE REINGANUM, JULIAN R. SPRAGUE and PHILIP S. STEVENS: Vibrational spectra and a potential function for 3-chlorocyclopropene and its various deuterated modifications . . . 569

Research Notes

P. L. GOODFRIEND: An absorption band system observed in the flash photolysis of $FNCl_2$ . . . 583

ANNE M. DEPROSPO, DANA P. MCDERMOTT and D. MICHAEL BYLER: The amide bond stretch of cyclic *cis*-amides . . . 587

Book Review . . . 589

Papers in Press . . . 591

Software Survey Section . . . I

No. 5 May

Professor W. C. PRICE FRS—an appreciation . . . i

FRANÇOIS MEMBREY et EFROIM STEINER: Etude par RMN ^{13}C des interactions intramoléculaires dans les benzènes *para*-disubstitués: mise en évidence par régressions linéaires de trois types de comportement 593

A. SUWAIYAN and R. ZWARICH: Absorption spectra of substituted indoles in stretched polyethylene films 605

M. J. IRVINE and A. D. E. PULLIN: Observation of novel matrix effects in the infrared matrix isolation spectrum of CO_2 in deuterium matrices . . . 611

M. A. BRODA and J. P. HAWRANEK: Infrared bandshapes of intramolecularly H-bonded systems—III. Vibrational dephasing of ν_s(OH) in 2,6-dichlorophenol . . . 617

M. PAGANNONE, B. FORNARI and G. MATTEI: Molecular structure and orientation of chemisorbed aromatic carboxylic acids: surface enhanced Raman spectrum of benzoic acid adsorbed on silver sol 621

T. R. DEVINE and T. A. KEIDERLING: Vibrational spectral assignment and enhanced resolution using magnetic vibrational circular dichroism . . . 627

BENNETT HUTCHINSON, BILL SPENCER, RON THOMPSON and PAUL NEILL: Metal–nitrogen stretching assignments in some metallophthalocyanines and μ-oxo-(Fephthalocyanine)$_2$ . . . 631

WOLFRAM W. SANDER: Chemiluminescence from arylcarbene oxidation: phenylchlorocarbene and (2-chlorophenyl)carbene . . . 637

RONALD L. RUBINOVITZ, THOMAS A. CELLUCCI and EUGENE R. NIXON: Matrix isolated Co atoms: excitation emission and the photochemical $Co + H_2 \rightarrow CoH_2$ reaction . . . 647

G. H. PIETERS, B. J. VAN DER VEKEN, A. J. BARNES, T. S. LITTLE, WEN-YUN ZHAO and J. R. DURIG: Spectra and structure of organophosphorus compounds—XXX. Vibrational and conformational study of methoxy difluorophosphinoxide-d_0 and d_3 . . . 657

M. WIERZEJEWSKA-HNAT, Z. MIELKE and H. RATAJCZAK: Infrared matrix isolation and gas phase studies of complexes between trifluoroacetic acid and diethylether and acetone . . . 675

A. PARDO, J. M. L. POYATO and J. J. CAMACHO: The intensity behaviour of the laser-induced fluorescence spectrum in the KH molecule . . . 679

H. YAMAGUCHI and H. BAUMANN: Photoelectron spectra of benzo[3,4]cyclobuta[1,2-*b*]quinoxaline and cyclobuta[1,2-*b*: 3,4-*b'*]diquinoxaline . . . 683

L. MEESUK, U. A. JAYASOORIYA and R. D. CANNON: Vibrational spectra of carboxylato complexes—VI. Isotopic substitution in the mixed-metal trinuclear complexes $[Fe^{III}_2Ni^{II}O(OOCCH_3)_6L_3]$ . . . 687

CARLOS SIEIRO, PALOMA CALLE, ANGELA SANCHEZ and JAVIER ZULUAGA: Electron spin resonance study of the planarity of hindered methylbenzoate radical anion derivatives . . . 693

SIMON J. DUNNE, DEBRA J. SEARLES and ELLAK I. VON NAGY-FELSOBUKI: *Ab initio* model of the Raman spectrum of Li_3^+: breathe mode frequencies 699

M. FERNANDEZ-GOMEZ, J. J. LOPEZ-GONZALEZ and M. MARTINEZ-SANCHEZ: A revised application of the effective nuclear charge model to the prediction of force constants in trigonal-bipyramid XY_5 molecules 703

Research Notes

A. L. EL-ANSARY, E. M. EBEID and M. M. OMAR: Emission characteristics of some 8-(arylazo)-7-hydroxy-4-methylcoumarins 709

ERI YAHAGI, SHINICHI MATSUMURA, YOSHIKA IMAI and KOYO AIDA: Far-i.r. spectra of charge-transfer complexes between IX (X = Cl, Br) and some pyridine and quinoline bases 711

THEODORE G. PAVLOPOULOS: Triplet–triplet absorption and polarization spectra of phenazine . . . 715

Book Review 717

Papers in Press 719

Conference Announcement 723

New Patents I

Software Survey Section III

No. 6 June

RICARDO AROCA, CAROL JENNINGS, RAFIK O. LOUTFY and AH-MEE HOR: Raman spectra of thin solid films—VI. Davydov splitting 725

KARL EICHINGER, PETER NUSSBAUMER und RICHARD VYTLACIL: Spektroskopische Untersuchungen von neuen ungewöhnlich oxidationsstabilen Kationenradikalen quartärer Pyridiniumverbindungen . . 731

G. CASSANAS, E. FABREGUE et L. BARDET: Spectres de vibration et liaison hydrogène du cyclobutane 1-1 dicarboxylate acide de potassium 735

G. CASSANAS, E. FABREGUE and L. BARDET: Vibrational spectra of potassium hydrogen 3,4 furan-dicarboxylate and intramolecular H-bond 741

E. SACHER: The correlation of N–H_n i.r. frequencies in amines 747

NORMAN C. CRAIG, JULIANTO PRANATA, JULIAN R. SPRAGUE and PHILIP S. STEVENS: Vibrational spectra of 3-fluorocyclopropene-d_0 and -d_3 753

M. SZPAKOWSKA and I. URUSKA: Solvent effect on u.v.–vis and EPR spectra and on the relative stability of mononuclear and binuclear complexes of Cu(II) acetate with pyridine derivatives 763

S. P. PERLEPES, P. JACOBS, H. O. DESSEYN and J. M. TSANGARIS: The vibrational spectra of complexes with planar monothio-oxamides—I. The Ni(II), Pd(II), Pt(II), Cu(II) and Zn(II) complexes of *N,N'*-dimethylmonothio-oxamide 771

D. STEELE and A. QUATERMAIN: The vibrational spectra of amides—II. The force field and isotopic shifts of *N,N*-dimethyl formamide 781

B. CZARNIK-MATUSEWICZ and J. P. HAWRANEK: I.r. bandshapes of weakly H-bonded systems. Vibrational dephasing in complexes of tertiary alcohols with diethyl ether 791

ALLAN H. FAWCETT, SEAN FEE, MICHAEL STUCKEY and PETER WALKDEN: The vibrational spectra and rotational isomerism of methyl ethyl sulphone-d_0, -d_3 and -d_5 797

ROBIN J. H. CLARK, COLIN D. FLINT and ANDREW J. HEMPLEMAN: F.t.i.r. and Raman spectra of triphenylphosphine, triphenylarsine, triphenylstibine, and dibenzylsulphide 805

ISAO KANESAKA, HIROYUKI NISHIMURA, KAN KANAMORI, KIYOYASU KAWAI, KENJI ICHIMURA and KUNIAKI WATANABE: The infra-red spectrum of $[Co(en)_3]Cl_3 \cdot 3T_2O$ (en: ethylenediamine) 817

J. DERKOSCH, W. MIKENDA und E. STEINWENDER: Spektroskopische Untersuchung von O–H . . . O(S) Wasserstoffbrückenbindungen in 2-Hydroxy-(dithio)benzoesäure und *N,N*-disubstituierten 2-Hydroxy-(thio)benzamiden 823

BRUNO LUNELLI and MARIA GRAZIA GIORGINI: Vibrational analysis of halogenated derivatives of cyclobuten-3,4-dione—I. 1,2-Dichloro-, 1-chloro-2-bromo, and 1,2-dibromocyclobuten-3,4-dione: . 829

KOYO AIDA, YOUICHI YAMAGUCHI and YOSHIKA IMAI: Vibrational spectra and normal coordinate calculations for dimethyltelluride-d_0, -d_6 and di-methyltellurium difluoride-d_0, -d_6 837

MOHAMMED I. M. WAZEER, SK. ASROF ALI and MOHAMMED ARAB: Synthesis and carbon-13 NMR study of some methanesulfonyloxy and trifluoroacetoxy derivatives of naphthalene 843

JAN MIKULEC and ČESTMÍR ČERNÝ: I.r. spectra of CH_2Cl_2 and $CHBr_3$ in argon matrices 849

T. K. PAL, G. K. MALLIK, S. LAHA, K. CHATTERJEE, T. GANGULY and S. B. BANERJEE: Electronic emission and absorption spectra and the effect of hydrogen bonding on the ground and excited electronic states of some anilines 853

Research Note

D. MICHAEL BYLER, HEINO SUSI and WILLIAM C. DAMERT: Relation between force constant and bond length for carbon–nitrogen bonds 861

Book Review 865

Papers in Press 867

New Patents i

Software Survey Section I

No. 7 July

A. A. Abd El Gaber, A. M. El Roudi and M. R. Mahmoud: Spectroscopic studies on intra- and inter-molecular hydrogen bonding in 2,4-dinitrophenol and 3,5-dinitrosalicylic acid 869

I. Lorite Villacreces, M. Fernandez Gomez, J. J. Lopez Gonzalez and A. Cardenete Espinosa: A general quadratic force field for the out-of-plane vibrations of the *s*-tetrazine molecule. 873

M. V. Garcia and M. I. Redondo: Influence of solvent polarity and acidity properties on the frequency of the carbonyl band of dimethylformamide, acetophenone and benzophenone 879

A. Pardo, J. J. Camacho, J. M. L. Poyato and E. Martin: The potential energy curves and probability density distributions of the $X^1\Sigma^+$ and $A^1\Sigma^+$ states of RBH 887

J. D. Warthen Jr., R. M. Waters and T. P. McGovern: ^{13}C and ^1H chemical shift assignments and conformation confirmation of trimedlure-Y via 2-D NMR 895

R. A. Yadav, S. Ram, R. Shanker and I. S. Singh: Vibrational spectrum, force field calculations, thermodynamic functions and barrier to internal rotation for benzoyl fluoride. 901

C. Sudha Kartha, T. Ramachandran, V. P. N. Nampoori and K. Sathianandan: Laser-excited fluorescence of Nd^{3+} in some fluoride crystals. 911

Frank Quaeyhaegens, Spiros P. Perlepes and Herman O. Desseyn: The vibrational spectra of Pd(II) complexes with planar monosubstituted oxamides 917

T. M. Abdul Rasheed, V. P. N. Nampoori and K. Sathianandan: Near i.r. spectrum of 2-butanone—a local mode analysis 925

T. V. K. Sarma and C. Santhamma: The near ultraviolet absorption spectra of 2,3-, 2,4- and 2,5-dimethylbenzonitriles 929

Gerd Schrumpf and Thomas Alshuth: Conformational equilibrium of dicyclopropyl ketone . . . 939

Nobuo Sato, Yoshiaki Hamada and Masamichi Tsuboi: Vibrational and conformational analysis of *n*-propylamine by means of i.r. spectroscopy and *ab initio* MO calculations 943

Bunji Uno, Yōichi Ninomiya, Kenji Kano and Tanekazu Kubota: New description of the substituent effect on electronic spectra by means of substituent constants—IV. Charge transfer spectra of EDA complexes of tetracyanoethylene with *meta*-disubstituted benzenes 955

A. Jyothi and G. N. Rao: Synthesis, structure and i.r. spectral studies of some new metal(II) complexes of 3-phenyl-4-benzoyl-5-isoxazolone (HPBI) 961

Research Note

T. Wachs, D. Borchardt and S. H. Bauer: Resolution of spectra of mixtures, applied to gaseous formic acids 965

Papers in Press 971

Addendum 973

New Patents i

Software Survey Section I

No. 8 August

A. G. Turner and W. R. Carper: Vibrational spectra and quantum mechanical assignments for 1-nitropropene 975

José Fernández Bertrán, José Blanco Pascual and Miriam Hernández: Chemical reactions of $K_3Fe(CN)_6$ in alkali halide disks 981

P. Klaeboe, C. J. Nielsen and D. L. Powell: The vibrational spectra of hexafluorocyclobutene and 1,2-dichlorotetrafluorocyclobutene 983

Moein B. Sayed: Fourier-transform i.r. gas chromatogrphy–mass spectrometry study of varying light olefin reactivity on dealuminated ZSM-5 991

O. Sarr and L. Diop: I.r. and Raman spectra of $M_3HP_2O_7 \cdot nH_2O$ (M = Na, Cs; $n = 0, 1, 9$). Correlation between the POP bridge vibrational frequencies and the POP angle value 999

S. P. Perlepes, P. Jacobs, H. O. Desseyn and J. M. Tsangaris: The vibrational spectra of complexes with planar monothio-oxamides—II. Complexes of $N_{(S)}$-methylmonothiooxamide 1007

Arun Joshi, J. Tonannavar, N. H. Ayachit, M. A. Shashidhar and K. Suryanarahyana Rao: Infra-red and electronic absorption spectra of 2-bromopyrimidine 1017

James E. Gano and E. Jean Jacob: Substituent effects on the ketene asymmetric stretching frequency 1023

M. Abe and Y. Kyogoku: Vibrational analysis of flavin derivatives: normal coordinate treatments of lumiflavin 1027

M. F. Gargallo Esteban, R. Vilaplana Serrano and F. González Vilchez: Synthesis and vibrational study of some polydentate ligands 1039

Ivan Baraldi, Enzo Gallinella and Marco Scoponi: Vibrational study of molecules with a geminal diphenyl group: a reappraisal of the Raman and i.r. spectra of 1,1′-diphenylethene and the low-frequency spectra of benzophenone, diphenylketimine, diphenylmethane and diphenylether . . . 1045

Salim S. Al-Showiman, Ibrahim M. Al-Najjar and Abdullah M. Al-Shalaan: ^1H and ^{13}C NMR study on some *N*-alkylimines derived from furfural and 2-acetylfuran. 1055

T. V. K. Sarma, C. V. R. Sastry and C. Santhamma: The photoacoustic specra of substituted benzenes in the near infrared region—I 1059

M. HIGASHI, H. YAMAGUCHI and K. FUJIMORI: Anomalous fluorescence spectra of azulenopyridines . 1067
R. M. BLIGH-SMITH, H. G. M. EDWARDS and V. FAWCETT: Force-constant calculations for $Ni(PF_3)_4$, $Pd(PF_3)_4$ and $Pt(PF_3)_4$ . . . 1069
LINDA M. OSBORNE and DENNIS J. CLOUTHIER: The vibrational and electronic spectroscopy of trifluorothioacetyl fluoride . . . 1075
J. L. DUNCAN and A. M. FERGUSON: High resolution infrared analyses of fundamentals and overtones in isotopic ketenes . . . 1081
N. SYAM SUNDAR and C. SANTHAMMA: Electronic absorption spectra of 2-amino-6-nitro, 4-amino-3-bromo- and 5-amino-2-bromotoluenes . . . 1087
Book Reviews . . . 1099
Papers in Press . . . 1101
Announcement . . . 1103
Erratum . . . i
Software Survey Section . . . I

No. 9 September

Review Article

KÁLMÁN BURGER: Capillary Mössbauer Spectroscopy (CMS)—a new method for the study of liquids fixed in a suitable carrier . . . 1105

General Papers

RICHARD A. FLETTON, ROBIN K. HARRIS, ALAN M. KENWRIGHT, ROBERT W. LANCASTER, KENNETH J. PACKER and NORMAN SHEPPARD: A comparative spectroscopic investigation of three pseudopolymorphs of testosterone using solid-state i.r. and high-resolution solid-state NMR . . . 1111
JASIM M. A. AL-RAWI, ABDUL-HUSSAIN KHUTHIER and FARIS T. ABACHI: Carbon-13 NMR study of some acetylenic amines, the *N*-oxides and their rearrangement products . . . 1121
L. L. GLADKOV, A. S. STARUKHIN and A. M. SHULGA: Vibrational states of chlorophyll and related compound molecules. Metal complexes of octaethylchlorin . . . 1125
P. RUOSTESUO, U. SALMINEN and R. LIIAS: Thermodynamic and spectroscopic properties of phosphorus compounds—complex formation between phosphorus compounds and various OH and NH proton donors . . . 1135
G. DÍAZ FLEMING and REX. E. SHEPHERD: Infrared spectra and normal coordinate analysis of bis(ethylenediamine) and bis(trimethylenediamine) complexes with copper(II) . . . 1141
KEN OHWADA: The effective nuclear charge model—IX. On the transferability of effective nuclear charges defined from homonuclear diatomic molecules . . . 1147
A. F. T. CHEN and M. SCHWARTZ: The effects of hydrogen bonding on vibrational frequencies and relaxation times in halomethanes . . . 1151
LOUISE SCHRIVER: Comparison of the proton and deuteron transfer in the hydrogen (deuterium) iodide–ammonia or trimethylamine systems trapped in argon and nitrogen . . . 1155
E. TOMÁS VERT, P. MEDINA CASAMAYOR, A. OLBA TORRENT and A. CODOÑER CASTELLOTE: The acid–base equilibria of dimethylphenols in the ground and the first excited singlet states . . . 1161
REINT EUJEN: Vibrational spectra and normal co-ordinate analysis of CF_3 compounds. Trimethyl-(trifluoromethyl)silane, $CF_3Si(CH_3)_3$ and $CF_3Si(CD_3)_3$ . . . 1165
M. A. RAUF and M. Z. ZAMAN: Spectral properties of oxazines in various solvents . . . 1171
A. C. DENGEL and W. P. GRIFFITH: The vibrational spectra of $[Nb(O_2)F_5]^{2-}$ . . . 1173
ALI EL-DISSOUKY: Metal complexes of 4,5-dimethylpyrazole-3-carboxaldehyde phenylthiosemicarbazone 1177
T. M. ABDUL RASHEED, K. P. B. MOOSAD, V. P. N. NAMPOORI and K. SATHIANANDAN: CH local mode excitations and Fermi resonance in trichloroethylene . . . 1183
BERND WRACKMEYER: ^{14}N Nuclear magnetic resonance spectroscopy of *N*-chloroamines . . . 1187

Research Notes

A. BORDELEAU, L. BERTRAND and E. SACHER: Photoacoustic infrared identification of N–H_n vibrations in hydrogenated amorphous silicon nitride . . . 1189
S. DURAI, V. RAVIKUMAR, N. NARAYANAN, T. R. BALASUBRAMANIAN and S. MOHAN: The synthesis, structure and infrared spectra of pyridinium bromochromate . . . 1191
Papers in Press . . . 1195
Software Survey Section . . . I

No. 10 October

EDITORIAL ANNOUNCEMENT: Sir Harold Thompson Memorial Award 1986 . . . i

General Papers

WALTER D. JONES and KWAI-PUI LEUNG: Infrared intensities and dipole derivatives of formamaide in chloroform . . . 1197

THEODORE G. PAVLOPOULOS: Measurement of triplet extinction coefficients of organic compounds by McClure's method . . . 1201

FRANS W. LANGKILDE, ROBERT WILBRANDT, OLE FAURSKOV NIELSEN, DANIEL HØJGAARD CHRISTENSEN and FLEMMING M. NICOLAISEN: Vibrational spectra of 1,3,5-hexatriene and methylated derivatives . . 1209

K. C. MEDHI: Electronic spectra of 2-methoxypyridine and 2-methoxy-d_3-pyridine . . . 1231

R. VISALAKSHI, V. K. JAIN and G. S. RAO: Synthesis and spectral studies of diorganotin(IV) dialkyldithiophosphates . . . 1235

DEREK J. GARDINER, NICHOLAS A. WALKER and MARTIN P. DARE-EDWARDS: Density and temperature effects on relative Raman intensities in liquid toluene . . . 1241

W. R. CARPER and J. J. P. STEWART: Effects of isotopic substitution on the vibrational spectra of 2,4,6-trinitrotoluene . . . 1249

I. LORITE VILLACRECES, M. FERNANDEZ GOMEZ, J. J. LOPEZ GONZALEZ and A. CARDENETE ESPINOSA: A study of series of force constants in the B_{3u} and B_{2g} symmetry species of *s*-tetrazine, using the display method . . . 1257

R. BELALI, J. M. VIGOUREUX and M. CAMELOT: Theoretical and experimental approach for the characterization of surface structural microtexture of intermediate thickness layers by attenuated total reflection . . . 1261

ANUSREE PURKAYASTHA and KAMAL KUMAR: Laser Raman scattering studies of vibrational relaxation and noncoincidence effect in liquid cyclohexanone . . . 1269

VIRENDRA KUMAR JAIN and Z. H. ZAIDI: Electronic absorption spectrum of perylene radical cation trapped in boric acid film . . . 1275

M. R. MAHMOUD, A. A. ABD EL GABER, A. M. EL ROUDI and E. M. SOLIMAN: More light on the low electronic transition energy bands of dithizone . . . 1281

M. M. C. FERREIRA and A. B. M. S. BASSI: The polar tensors, effective charges and separation ratios of overlapped bands in methanes . . . 1287

Research Note

C. J. GABRIEL, P. A. MOSIER-BOSS and S. SZPAK: Resolution of vibrational bands into Voigt profiles . 1293

Book Review . . . 1297

Papers in Press . . . 1299

New Patents . . . i

Software Survey Section . . . I

No. 11 November

H.-D. AMBERGER und H. SCHULTZE: Zur Elektronenstruktur metallorganischer Komplexe der *f*-Elemente—XX. Vibronische Kopplungen bei Tris (η^5-cyclopentadienyl)-lanthanoid(III)-Addukten . 1301

IBRAHIM M. AL-NAJJAR and HASSAN B. AMIN: The carbon-13 chemical shifts and the analysis of the relaxation times T_1 and long range ^{13}C–^1H coupling constants of quinoline and of 1-(X-quinolyl)ethyl acetate derivatives . . . 1307

DIMITRI NOUKAKIS and PAUL SUPPAN: Excited state dipole moments of fluoroanilines from solvatochromic shift measurements . . . 1317

JOHN R. LOMBARDI: On the comparison of solvatochromic shifts with gas phase Stark effect measurements 1323

K. HASSLER und G. BAUER: Synthese, Infrarot- und Raman-Spektren der Heptamethyltrisilane XMe_2Si–$SiMe_2$–$SiMe_3$, X = H, F, Cl, Br, I, OMe, Ph . . . 1325

M. A. PAZ-SANDOVAL, C. CAMACHO, R. CONTRERAS and B. WRACKMEYER: ^{13}C Nuclear magnetic resonance studies of aromatic amine–borane adducts . . . 1331

Y. A. SARMA: In-plane vibrations of copper-porphins . . . 1337

H. G. M. EDWARDS and V. FAWCETT: Force constants of phosphorus (III) cyanide and arsenic (III) cyanide . . . 1345

JORMA HÖLSÄ and MARKKU LESKELÄ: Optical study of Eu^{3+} luminescence in Gd, Y and Lu oxyselenites by site selective excitation . . . 1349

LOUIS CAZAUX, YAHIA KOUDSI and PIERRE MARONI: Conformational analysis of cyclic sulphites. 2-Oxo 1,3,2-dioxathiane-4-spiro-4-*tert*-butyl-cyclohexanes . . . 1355

BAOZHONG LI, QINGSHI ZHU and ZHIYE SHEN: A high resolution spectroscopic study of the SF_6 $\nu_1 + \nu_4$ combination band . . . 1361

L. BRACO, F. CHILLARON, M. C. BANO, M. DE LA GUARDIA and C. ABAD: Determination of the relative quantum yields of the conformational species of autoassociating polypeptide gramicidin A in organic solvent using combined fluorescence spectroscopy and high performance liquid chromatography . 1365

A. S. EL-SHAHAWY, M. M. GIRGIS and M. T. ISMAIL: Nicotinic acid and nicotinamide electronic structural studies . . . 1371

H. YAMAGUCHI, M. HIGASHI and K. FUJIMORI: Anomalous fluorescence spectra of azuleno[1,2-*b*]furan 1377

ARMANDO CODOÑER, ISIDRO S. MONZÓ, FRANCISCO TOMÁS and ROSA VALERO: Ground and first excited electronic state interactions of FAD with some β-carboline derivatives . . . 1379

RICHARD H. CLARKE and SOOKHEE HA: Resonance Raman spectroscopy of proflavin (II) . . . 1385

D. JAFFE: FT-i.r. spectra of acetic acid and deuterated analogs in the monomer O–H and O–D regions 1393

PIERRE VARIN, JOËL VEBREL, BERNARD LAUDE, ALAIN XICLUNA et JEAN-FRANÇOIS ROBERT: Configuration et conformation des produits issus de la réaction d'un thioacétate d'alkyle sur une diphényl-1,3-propène-2-one-1 substituée en 2. 1397

D. C. MCKEAN, G. P. MCQUILLAN, J. L. DUNCAN, N. SHEPHARD, B. MUNRO, V. FAWCETT and H. G. M. EDWARDS: Vibrational spectra of trimethyl gallium species in relation to the force field and methyl group internal rotation 1405

PEDRO A. M. VAZQUEZ and YOSHIYUKI HASE: Low wavenumber Raman bands (300–50 cm^{-1}) and isotopic effects of lithium acetate dihydrate. 1413

ASHUTOSH SHARMA and OTTO S. WOLFBEIS: The quenching of the fluorescence of polycyclic aromatic hydrocarbons and rhodamine 6G by sulphur dioxide 1417

LAI XAOJUN and WU GUOZHEN: Temperature dependent Raman study of barium metaborate crystal 1423

M. HIGASHI, H. YAMAGUCHI and T. MACHIGUCHI: The circular dichroism spectra of the cyclodextrin complex with tropone 1427

Research Notes

J. PIELICHOWSKI and W. WILK: Geometric isomers of N-(1,2 dichlorovinyl) carbazole 1429

H. YAMAGUCHI and M. HIGASHI: Electronic spectra of carbazole, dibenzofuran and dibenzothiophene 1431

J. HODGE MARKGRAF, CHRISTOPHER R. MYERS and ROBERT J. LUMLEY: Strained heterocyclic systems—XV. Infrared spectra of substituted quinoline N-oxides. 1435

Book Review 1437

Papers in Press 1439

Software Survey Section I

No. 12 December

Professor Norman Sheppard FRS vii

D. SCARANO and A. ZECCHINA: Adsorbate–adsorbent and adsorbate–adsorbate interactions in CO overlayers adsorbed on α-Cr_2O_3 as investigated by infrared spectroscopy 1441

A. F. CARLEY, D. E. GALLAGHER and M. W. ROBERTS: Activation of carbon dioxide and carbon monoxide at aluminium surfaces 1447

MOHAMMED I. ZAKI and HELMUT KNÖZINGER: Characterization of oxide surfaces by adsorption of carbon monoxide—a low temperature infrared spectroscopy study 1455

STEPHEN A. LAWRENCE and PAUL A. SERMON: NMR analysis of complexation during adsorption and catalyst preparation upon alumina. 1461

G. THORNTON, I. W. OWEN, C. H. RICHARDSON, D. NORMAN, R. A. TUCK, H. B. SKINNER, P. J. WADSWORTH and T. M. GARDINER: The local coordination of barium atoms at the active-sites of thermionic cathodes. 1467

M. E. BRIDGE, M. CONNOLLY, D. R. LLOYD, J. SOMERS, P. JAKOB and D. MENZEL: Electron spectroscopic studies of pyridine on metal surfaces 1473

C. N. R. RAO, G. RANGA RAO, M. K. RAJUMON and K. PRABHAKARAN: A comparative study of CO and N_2 adsorbed on clean and promoted transition metal surfaces by a combined use of EELS, XPES and UVPES 1479

MOHAMMED BENSITEL, VLADIMIR MORAVEK, JEAN LAMOTTE, ODETTE SAUR and JEAN-CLAUDE LAVALLEY: Infrared study of alcohols adsorption on zirconium oxide: reactivity of alkoxy species towards CO_2 1487

D. C. TILOTTA, R. M. HAMMAKER and W. G. FATELEY: The feasibility of near-infrared electrooptic Hadamard transform Raman spectrometry 1493

R. ZANONI and R. PSARO: *In situ* XPS characterization of the species derived from supported Os carbonyls 1497

Z. J. T. GRAY-GRYCHOWSKI, W. R. FLAVELL, R. G. EGDELL, R. A. STRADLING, B. A. JOYCE and J. H. NEAVE: Application of HREELS to MBE-grown III-V materials 1503

C. DOSSI, R. PSARO, R. ZANONI and F. S. STONE: Spectroscopic studies on silica-supported $Os_3(CO)_{12}$ 1507

JOHN EVANS: Characterization of oxide supported metal carbonyl clusters 1511

T. S. JONES and S. HOLLOWAY: A theoretical study of vibrational lineshapes for simple molecules adsorbed on surfaces: a classical trajectory approach. 1515

W. B. BANKS and N. L. OWEN: FTIR studies of hydrophobic layers on wood. 1527

S. ERIKSEN, P. D. NAYLOR and R. G. EDGELL: The adsorption of water on $SrTiO_3$ and TiO_2: a reappraisal 1535

P. HOLLINS: Effects of dipolar coupling on the intensity of infrared absorption bands from supported metal catalysts. 1539

JOHN R. BARTLETT and RALPH P. COONEY: Conformations of 2,2′-bipyridine on NaX and NaY: a Raman and FT-i.r. spectroscopic study 1543

J. S. SOMERS, M. E. BRIDGE and D. R. LLOYD: An angle resolved UPS study of benzene adsorption on Pt(111) 1549

ZOFIA DEGA-SZAFRAN, ANDRZEJ HRYNIO and MIROSŁAW SZAFRAN: Integrated intensity of continuous absorption in infrared spectra of complexes with medium-strong and strong hydrogen bonds . . 1553

M. E. KORDESCH, TH. LINDNER, J. SOMERS, W. STENZEL, H. CONRAD, A. M. BRADSHAW and G. P. WILLIAMS: The surface chemistry of the CN group: geometry and bonding 1561

EDOARDO GARRONE, SALVATORE COLUCCIA and ELIO GIAMELLO: Infrared study of the reaction of N_2O with NH_3 and primary amines on MgO 1567

SALVATORE COLUCCIA, LEONARDO MARCHESE, SILVIO LAVAGNINO and MASAKAZU ANPO: Hydroxyls on the surface of MgO powders 1573

C. MORTERRA, E. GARRONE, V. BOLIS and B. FUBINI: An infrared spectroscopic characterization of the coordinative adsorption of carbon monoxide on TiO_2 1577

B. A. MORROW, M. I. BARATON, Y. LIJOUR and J. L. ROUSTAN: An FT-i.r. study of the deposition of $Co(CO)_3NO$ on zeolite-Y: influence of the support on the formation of isocyanates 1583

MONA ARIF: Intermolecular vibrational interaction in isotopic mixed crystals of $M(CO)_5X$ 1589

XIAOCHUN LI, STEPHEN J. STOTESBURY and UPALI A. JAYASOORIYA: Infrared spectra of urea isolated in a solid argon matrix 1595

A. MUÑOZ, A. R. GONZÁLEZ-ELIPE, G. MUNUERA, J. P. ESPINÓS and V. RIVES-ARNAU: IR and XPS studies of the reactivity of CO with Ti–H species at the support on Rh/TiO_2 catalysts 1599

R. W. JUDD, H. J. ALLEN, P. HOLLINS and J. PRITCHARD: RAIRS at higher pressures: Ni(110)–CO and Cu(111)–CO 1607

B. SAKAKINI, C. HARENDT and J. C. VICKERMAN: An EELS study of the adsorption and decomposition of deuterated ethene on Cu/Ru(0001) 1613

G. H. DAVIES and J. YARWOOD: Infrared intensity and band shape studies on Langmuir–Blodgett films of ω-tricosenoic acid on silicon 1619

MICHAEL A. CHESTERS and ELAINE M. MCCASH: The adsorption and reaction of methanol on oxidized copper(111) studied by Fourier transform reflection–absorption infrared spectroscopy 1625

GHULAM HUSSAIN and NORMAN SHEPPARD: The generation of formate species on the surface of zinc oxide near 200°C from CO with H_2, or from CO alone, as shown by infrared spectroscopy 1631

AUTHOR INDEX

Abachi, F. T. 1121
Abad, C. 1365
Abd El Gaber, A. A. 869, 1281
Abdel-Hamid, R. 497
Abdul Rasheed, T. M. 925, 1183
Abe, M. 1027
Adbel-Rahman, M. A. 497
Ahra, M. 539
Aida, K. 711, 837
Al-Najjar, I. M. 1055, 1307
Al-Rawi, J. M. A. 1121
Al-Shalaan, A. M. 1055
Al-Showiman, S. S. 1055
Albrecht, H. 225
Alexandrescu, R. 163
Ali, Sk. A. 843
Allen, H. J. 1607
Alshuth, T. 939
Amberger, H.-D. 1301
Amin, H. B. 1307
Andino, M. M. 427
Anpo, M. 1573
Arab, M. 843
Arenas, J. F. 447
Arif, M. 1589
Arnoldus, H. F. 201
Aroca, R. 725
Avarmaa, R. 507
Ayachit, N. H. 1017

Bagratashvili, V. N. 169
Balasubramanian, T. R. 1191
Baldacci, A. 455
Banerjee, S. B. 853
Banks, W. B. 1427
Bano, M. C. 1365
Baraldi, I. 1045
Baraton, M. I. 1583
Bardet, L. 735, 741
Barnes, A. J. 657
Bartlett, J. R. 1543
Bassi, A. B. M. S. 1287
Bauer, G. 1325
Bauer, S. H. 227, 965
Baumann, H. 683
Bautista Rodriguez, J. M. 355
Belali, R. 1261
Bensitel, M. 1487
Bertrand, L. 1189
Beurskens, P. T. 35
Bilalov, F. S. 309, 475
Blanco Pascual, J. 981
Blazejowski, J. 265
Bligh-Smith, R. M. 1069
Bogang, T. 65
Bolis, V. 1577
Borchardt, D. 965
Bordeleau, A. 1189
Boriev, I. A. 281
Borsella, E. 277
Botto, I. L. 119
Braco, L. 1365
Bradshaw, A. M. 1561
Brassington, D. J. 451, 549
Bridge, M. E. 1473, 1549
Broda, M. A. 617
Bunkin, F. V. 211
Burger, K. 1105
Burimov, V. N. 169
Burshtein, A. I. 483
Busca, G. 489
Bussacchini, V. 409
Byler, D. M. 587, 861

Calle, P. 693
Camacho, C. 1331
Cámacho, J. J. 679, 887
Camelot, M. 1261
Caneve, L. 277
Cannon, R. D. 687
Cardenete, A. 447
Carley, A. F. 1447
Carper, W. R. 975, 1249
Casamayor, P. M. 1161
Cassanas, G. 735, 741
Cazaux, L. 1355
Cellucci, T. A. 647
Cerny, C. 849
Chatterjee, K. 853
Cheikh, M. 515
Chen, A. F. T. 1151
Chesters, M. A. 1625
Chillaron, F. 1365
Chowdhury, P. K. 199
Christensen, D. H. 331
Chugunov, A. V. 171
Clark, R. J. H. 805
Clarke, R. H. 1385
Clouthier, D. J. 1075
Codoner, A. 389, 1379
Codoner Castellote, A. 1161
Colthup, N. B. 317
Coluccia, S. 1567, 1573
Connolly, M. 1473
Conrad, H. 1561
Contreras, R. 43, 1331
Cooney, R. P. 1543
Craig, N. C. 569, 753
Crayston, J. A. 559
Czarnik-Matusewicz, B. 791

D'Ambrosio, C. 189
Damert, W. C. 861
Danen, W. C. 173
Dare-Edwards, M. P. 21, 1241
Davidson, G. 559
Davis, G. H. 1619
Dawei, L. 375, 379
DeProspo, A. M. 587
Dega-Szafran, Z. 1553
Degtyarik, M. M. 349
Dengel, A. C. 1173
Derkosch, J. 823
Desseyn, H. O. 35, 531, 771, 917, 1007
Devine, T. R. 627
Diallo, A. O. 415
Diaz Fleming, G. 1141
Diop, L. 999
Dogra, S. K. 91
Dominguez, C. 43
Dommisse, R. 35
Dossi, C. 1507
Doucet, J. P. 17
Draganescu, V. 163
Dube, N. 83
Duncan, J. L. 1081, 1405
Dunne, S. J. 699
Durai, S. 1191
Durig, J. R. 657

Ebeid, E. M. 709
Eckhardt, R. C. 141
Edwards, H. G. M. 451, 1069, 1345, 1405
Egdell, R. G. 1503, 1535
Eichinger, K. 731
El Roudi, A. M. 869, 1281
El-Ansary, A. 709
El-Dissouky, A. 1177
El-Sagher, H. 497
El-Samahy, A. A. 497
El-Shahawy, A. S. 1371
Eriksen, S. 1535
Espinos, J. P. 1599
Espinosa, A. C. 873, 1257
Eujen, R. 1165
Evans, J. 1511

Fabregue, E. 735, 741
Fan-chen, L. 375, 379
Farneth, W. E. 181

Fateley, W. G. 1493
Faurskov Nielsen, O. 1209
Fawcett, A. H. 797
Fawcett, V. 451, 1069, 1345, 1405
Fedorenko, S. G. 483
Fee. S. 797
Ferguson, A. M. 1081
Fernandez Bertran, J. 981
Fernandez-Gomez, M. 447, 703, 873, 1257
Ferreira, M. M. C. 345, 1287
Flavell, W. R. 1503
Fletton, R. A. 1111
Flint, C. D. 805
Fornari, B. 621
Francisco, J. S. 207
Frech, R. 59
Freedman, A. N. 549
Freudenberg, T. 225
Fubini, B. 1577
Fujimori, K. 1067, 1377
Fuss, W. 189, 193

Gabriel, C. J. 1293
Gallagher, D. E. 1447
Gallinella, E. 1045
Gambi, A. 455
Ganguly, T. 853
Gano, J. E. 1023
Gaponik, P. N. 349
Garcia, M. V. 879
Garcia Sanchez, F. 101
Garcia-Vargas, M. 355
Gardiner, D. J. 21, 1241
Gardiner, T. M. 1467
Gargallo Esteban, M. F. 1039
Garrone, E. 1567, 1577
Geboes, P. 35
Geldard, J. F. 439
George, T. F. 201
Gerval, P. 539
Ghersetti, S. 455
Giamello, E. 1567
Giardini-Guidoni, A. 277
Giorgianni, S. 455
Girgis, M. M. 1371
Gladkov, L. L. 1125
Goethals, G. 17
Golden, D. M. 237
Gonzalez, A. C. 237
Gonzalez Vilchez, F. 1039
Gonzalez-Elipe, A. R. 1599
Goodfriend, P. L. 583
Gordon, E. B. 281
Graves, R. J. 107
Gray-Grychowski, Z. J. T. 1503
Grazia Giorgini, M. 829
Griffith, W. P. 1173
Grignon-Dubois, M. 539
Guardia, M. de la 1365
Guozhen, W. 65, 1423

Ha, S. 1385
Hamada, Y. 943
Hammaker, R. M. 1493
Hanuza, J. 361
Harendt, C. 1613
Harris, R. K. 1111
Hase, Y. 1413
Hassler, K. 1325
Hawranek, J. P. 617, 791
Hegde, M. S. 471
Hempleman, A. J. 805
Hemptinne, X. de 155
Henning, J. 395
Hernandez Lopez, M. 101
Hernandez, M. 981
Hevesi, I. 211
Hidalgo de Cisneros, J. L. 355
Higashi, M. 79, 1067, 1377, 1427, 1431
Hofmans, H. 35, 531
Hohmann, H. 225
Hojgaard Christensen, D. 1209
Hollins, P. 1539, 1607
Holloway, S. 1515
Holsa, J. 1349
Hor, A.-M. 725
Houwen, X. 375, 379
Howe, R. F. 73
Hrynio, A. 1553
Hubbard, R. 515
Hussain, G. 1631
Hutchinson, B. 631

Ibrahim, Md. S. B. 173
Ichimura, K. 817
Imai, Y. 711, 837
Ionov, S. I. 167, 169
Irvine, M. J. 611
Ismail, M. T. 1371
Ivanov, S. V. 171

Jacob, E. J. 1023
Jacobs, P. 771, 1007
Jaffe, D. 1393
Jain, V. K. 1235
Jakob, P. 1473
James, B. D. 383
Janin, A. 489
Jayasooriya, U. A. 687, 1595
Jennings, C. 725
Jian, W. 375, 379
Johansen, H. 285
Johnson, D. G. 181
Jones, T. S. 15154
Jones, W. D. 1197
Joshi, A. 1017
Joyce, B. A. 1503
Judd, R. W. 1607
Jyothi, A. 517, 961

Kajkowski, K. A. 241
Kaldor, A. 269
Kanamori, K. 817
Kanesaka, I. 817
Kano, K. 955
Karlov, N. V. 163
Karve, R. S. 165
Kasmir Raja, S. V. 501
Kawai, K. 817
Keiderling, T. A. 627
Kenwright, A. M. 1111
Kern, J. 197
Khanna, R. K. 421
Khuthier, A.-H. 1121
Kim, S.-B. 59
Kimel, S. 149
Klaeboe, P. 983
Kliche, G. 395
Knozinger, H. 1455
Kompa, K. L. 189, 193
Kordesch, M. E. 1561
Korshak, V. V. 223
Koudsi, Y. 1355
Kowalewski, J. 545
Kozlov, M. F 323
Kubota, T. 955
Kumar Jain, V. 1275
Kumar, K. 1269
Kyogoku, Y. 1027

Lagutchev, A. S. 163
Laha, S. 853
Laird, C. K. 549
Lamotte, J. 1487
Lampe, F. W. 257, 265
Lancaster, R. W. 1111
Langkilde, F. W. 1209
Larsson, K. M. 545
Laude, B. 1397
Lavagnino, S. 1573
Lavalley, J.-C. 489, 1487
Lawrence, S. A. 1461
Lenstra, A. T. H. 35
Lenzi, M. 137
Leskela, M. 1349
Lesnikovich, A. I. 349
Leung, K.-P. 1197
Li, B. 1361
Li, X. 1595
Liias, R. 1135
Lijour, Y. 1583
Lima, C. G. de 427
Lindner, Th. 1561
Linyang, Z. 193
Little, T. S. 657
Llooyd, D. R. 1549
Lloyd, D. R. 1473
Loehr, T. M. 51
Lombardi, J. R. 1323
Lopez-Gonzalez, J. J. 447, 703, 873, 1257
Lorenzelli, V. 489
Loutfy, R. O. 725
Lozovsky, A. D. 213
Ludvik, J. 297
Luk'yanchuk, B. S. 211
Lumley, R. J. 1435
Lunelli, B. 829
Lutz, H. D. 395
Lyman, J. L. 141

Macalik, L. 361
Machiguchi, T. 1427
Mahmoud, M. R. 869, 1281
Mallik, G. K. 853
Manoharan, R. 91
Marchand, A. 539
Marchese, L. 1573
Markgraf, J. H. 1435
Maroni, P. 1355
Marquez Gomez, J. C. 101
Martin, E. 887
Martinez-Sanchez, M. 703
Matsumura, S. 711
Mattei, G. 621
Mauring, K. 507
Maylor, P. D. 1535
McCash, E. M. 1625
McDermott, D. P. 587
McDowell, H. K. 439
McGovern, T. P. 895
McKean, D. C. 1405
McMillen, D. F. 237
McQuillan, G. P. 1405
Meallier, P. 409
Medhi, K. C. 1231
Medina, P. 389
Meesuk, L. 687
Mele, A. 253, 277

Membrey, F. 593
Mendoza, M. de L. 43
Mengxiong, G. 193
Menzel, D. 1473
Meyer, C. F. 241
Mielke, Z. 675
Mihailescu, I. N. 163
Mikenda, W. 823
Mikulec, J. 849
Milla, M. 355
Mittal, J. P. 165, 199
Mohan, S. 1191
Molinari, E. 137, 253
Monzo, I. S. 389, 1379
Moosad, K. P. B. 1183
Morales, H. R. 43
Moravek, V. 1487
Moreau-Descoings, M. C. 17
Morjan, I. 163
Morrow, B. A. 1583
Morterra, C. 1577
Mosier-Boss, P. A. 1293
Mourad, A. E. 11
Muller, R. 285
Munoz, A. 1599
Munro, B. 1405
Munuera, G. 1599
Myers, C. R. 1435

Nagy-Felsobuki, E. I. von 699
Nakane, H. 135
Nampoori, V. P. N. 911, 925, 1183
Nanai, L. 211
Narayanan, N. 1191
Naumenko, V. N. 349
Neave, J. H. 1503
Neill, P. 631
Nemes, L. 243
Nguyen, H. H. 173
Nguyen-van-Thanh 415
Nicolaisen, F. M. 1209
Nielson, C. J. 983
Nigenda, S. E. 237
Nikanovich, M. V. 349
Ninomiya, Y. 955
Nishimura, H. 817
Nixon, E. R. 647
Norman, D. 1467
Noukakis, D. 1317
Nussbaumer, P. 731

Ohwada, K. 1147
Olba Torrent, A. 1161
Omar, M. M. 709
Orlov, A. N. 163
Osborne, L. M. 1075
Ospina, M. J. 421
Owen, I. W. 1467
Owen, N. L. 1527

Packer, K. J. 1111
Pagannone, M. 621
Pal, T. K. 853
Panchenko, V. Ya. 171
Panesh, A. M. 213
Pardo, A. 679, 887
Pavlopoulos, T. G. 715, 1201
Paz-Sandoval, M. A. 1331
Peremans, A. 201
Perera-Jarmer, M. A. 421
Perichet, G. 409
Perlepes, S. P. 771, 917, 1007
Petrov, Yu. N. 163
Piciacchia, G. 137
Pielichowski, J. 1429
Pieters, G. H. 657
Poh, B.-L. 401
Pokhodnia, K. I. 323
Pola, J. 297
Poliakoff, M. 217
Pominov, I. S. 309, 475
Porter Powell, L. 317
Powell, D. L. 983
Poyato, J. M. L. 679, 887
Prabhakaran, K. 1479
Pranata, J. 569, 753
Prasad, R. 83
Pritchard, J. 1607
Prokhorov, A. M. 163
Psaro, R. 1497, 1507
Pullin, A. D. E. 611
Purkayastha, A. 1269
Pusep, A. Yu. 483

Quaeyhaegens, F. 531, 917
Quatermain, A. 781

Radloff, W. 225
Rajumon, M. K. 1479
Ram, S. 901
Rama Rao, K. V. S. 165, 199
Ramachandran, T. 911
Ramis, G. 489
Ramos, M. N. 345
Ranga Rao, G. 1479
Rao, C. N. R. 471, 1479
Rao, G. N. 517, 961
Rao, G. S. 1235
Ratajczak, H. 675
Rauf, M. A. 1171
Ravikumar, V. 1191
Redondo, M. I. 879
Reinganum, S. J. 569
Remizov, A. B. 309, 475
Renge, I. 507
Rice, G. W. 299
Richardson, C. H. 1467
Rigg, J. C. 1
Rives-Arnau, V. 1599
Robert, J.-F. 1397
Roberts, M. W. 1447
Rossi, I. 415
Roustan, J. L. 1583
Rubinovitz, R. L. 647
Ruiya, X. 65
Rulmont, A. 337
Ruostesuo, P. 1135
Rytter, E. 523

Sacher, E. 747, 1189
Said-Galiyev, E. E. 223
Sakakini, B. 1613
Salminen, U. 1135
Salvetti, F. 253
Sanchez, A. 693
Sander, W. W. 637
Sanni, S. B. 35
Santhamma, C. 929, 1059, 1087
Sarkar, S. K. 165
Sarma, T. V. K. 929, 1059
Sarma, Y. A. 1337
Sarr, O. 999
Sarv, P. 507
Sastry, C. V. R. 1059
Sathianandan, K. 911, 925, 1183
Sathyanarayana, D. N. 501
Sato, N. 943
Saur, O. 1487
Sayed, M. B. 991
Sbai, K. 337
Scarano, D. 1441
Schatzberger, R. 149
Schhriver, L. 1155
Schmid, W. E. 189
Schramm, M. 197
Schrumpf, G. 939
Schultze, H. 1301
Schwartz, M. 1151
Scoponi, M. 1045
Searles, D. J. 699
Seguin, J. P. 17
Sermon, P. A. 1461
Sessa, V. 137
Setser, D. W. 173
Shanker, R. 901
Sharma, A. 1417
Shashidhar, M. A. 1017
Shen, Z. 1361
Shephard, N. 1405
Shepherd, R. E. 1141
Sheppard, N. 1, 1111, 1631
Shirley, W. M. 565
Shulga, A. M. 1125
Shunmugam, R. 501
Sieiro, C. 693
Simonot-Grange, M. H. 337
Simonov, A. P. 213
Singh, I. S. 901
Skinner, H. B. 1467
Smaalen, S. van 201
Smith, B. E. 383
Smits, J. M. M. 35
Soliman, E. M. 1281
Somers, J. 1473, 1561
Somers, J. S. 1549
Spanget-Larsen, J. 331
Spencer, B. 631
Spinner, E. 301
Sprague, J. R. 569, 753
Sreekanth, C. S. 471
Starukhin, A. S. 1125
Steel, C. 149
Steele, D. 781
Steiner, E. 593
Steinfeld, J. I. 129, 207
Steinwender, E. 823
Stenzel, W. 1561
Stevens, P. S. 569, 753
Stewart, J. J. P. 1249
Stone, F. S. 1507
Stotesbury, S. J. 1595
Stradling, R. A. 1503
Stuchebrukhov, A. A. 169
Stuckey, M. 797
Sudha Kartha, C. 911
Suppan, P. 1317
Suryanarayana Rao, K. 1017
Susi, H. 861
Suwaiyan, A. 605
Sviridov, A. P. 169
Syam Sundar, N. 1087
Szafran, M. 1553
Szekely, T. 243
Szpak, S. 1293
Szpakowska, M. 763

Tanaka, H. 395
Tardieu de Maleissye, J. 289
Tarte, P. 337
Taylor, M. J. 73

Telle, J. M. 141
Terranova, M. L. 137, 253
Thompson, R. 631
Thomsen, M. W. 181
Thornton, G. 1467
Thulstrup, E. W. 331
Tilotta, D. C. 1493
Tomas, F. 389, 1379
Tonannavar, J. 1017
Trettnak, W. 405
Tsangaris, J. M. 771, 1007
Tsuboi, M. 943
Tsuchiya, S. 135
Tuck, R. A. 1467
Turner, A. G. 975
Turovetz, I. M. 169

Uno, B. 955
Ursu, I. 163
Uruska, I. 763

Valero, R. 1379
Varakin, V. N. 213
Varin, P. 1397
Vazquez, P. A. M. 1413
Vebrel, J. 1397
Veken, B. J. van der 657
Vert, E. T. 1161
Vickerman, J. C. 1613
Vigoureux, J. M. 1261
Vilaplana Serrano, R. 1039
Villacreces, I. L. 873, 1257
Visalakshi, R. 1235
Visinoni, R. 455
Vytlacil, R. 731

Wachs, T. 965
Wadsworth, P. J. 1467
Walkden, P. 797
Walker, N. A. 21, 1241
Warthen, J. D. Jr. 895
Watanabe, K. 817
Waters, R. M. 895
Wazeer, M. I. M. 843
White, H. W. 107
Wierzejewska-Hnat, M. 675
Wilbrandt, R. 1209
Wilk, W. 29
Williams, G. P. 1561
Willis, H. A. 1
Willis, L. J. 51
Winefordner, J. D. 427
Wolfbeis, O. S. 405, 1417
Woodin, R. L. 241, 269, 299
Wrackmeyer, B. 1187, 1331

Xaojun, L. 1423
Xicluna, A. 1397
Xu, S. 375, 379

Yadav, R. A. 901
Yahagi, E. 711
Yamaguchi, H. 79, 683, 1067, 1377, 1427, 1431
Yamaguchi, Y. 837
Yarwood, J. 1619
Yurchenko, A. A. 323

Zaidi, Z. H. 1275
Zaki, M. I. 1455
Zaman, M. Z. 1171
Zanoni, R. 1497, 1507
Zecchina, A. 1441
Zhao, W.-Y. 657
Zhu, Q. 1361
Zimmerman, P. G. 181
Zitter, R. N. 245
Zuluaga, J. 693
Zwarich, R. 605

PRINTEDIN GREAT BRITAIN BY A. WHEATON & CO. LTD., EXETER